



PATENT
450110-02747

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Adrian Charles PASKINS
Serial No. : 09/630,971
Filed : August 1, 2000
For : DATA BROADCAST METHOD
Art Unit : 2711

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Name of Applicant, Assignee or
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Date of Signature

CLAIM OF PRIORITY

Assistant Commissioner for Patents
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Sir:

In support of the claim of priority under 35. U.S.C.
§ 119 asserted in the Declaration accompanying the above-entitled
application, as filed, please find enclosed herewith a certified
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1999 forming the basis for such claim.

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PATENT
450110-02747

Acknowledgment of the claim of priority and of the
receipt of said certified copy(s) is requested.

Respectfully submitted,

FROMMER LAWRENCE & HAUG LLP
Attorneys for Applicant

By:


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Enclosure(s)

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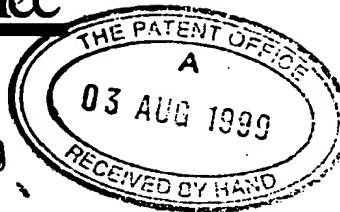
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Statement of inventorship and of
right to grant of a patent

03 AUG 1999

The Patent Office

Cardiff Road
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1. Your reference N.76958 SLS

2. Patent application number **9918284.2**
(If you know it)

3. Full name of the or of each applicant SONY UNITED KINGDOM LIMITED

4. Title of the invention DATA BROADCAST METHOD

5. State how the applicant(s) derived the right from the inventor(s) to be granted a patent By employment and assignment

6. How many, if any, additional Patents Forms 7/77 are attached to this form?
(see note (c))

7. I/We believe that the person(s) named over the page (and on any extra copies of this form) is/are the inventor(s) of the invention which the above patent application relates to.

Signature

Date 3 August 1999

J A KEMP & CO.

8. Name and daytime telephone number of person to contact in the United Kingdom 0171 405 3292

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Enter the full names, addresses and postcodes of the inventors in the boxes and underline the surnames

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736046600line

Patents ADP Number (if you know it)

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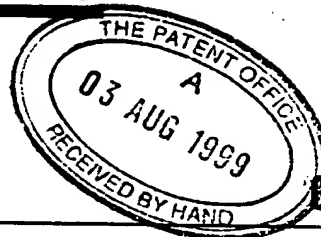
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1. Your reference	N.76958 SLS		
2. Patent application number (The Patent Office will fill in this part)	9918284.2		
3. Full name, address and postcode of the or of each applicant (underline all surnames)	SONY UNITED KINGDOM LIMITED The Heights Brooklands Weybridge SURREY KT13 OXW 6522700001, m.d. UNITED KINGDOM		
Patents ADP number (if you know it) If the applicant is a corporate body, give the country/state of its incorporation			
4. Title of the invention	DATA BROADCAST METHOD		
5. Name of your agent (if you have one)	J A KEMP & CO		
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)	14 SOUTH SQUARE GRAY'S INN LONDON WC1R 5LX 26001		
Patents ADP number (if you know it)			
6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number	Country	Priority application number (if you know it)	Date of filing (day / month / year)
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing (day / month / year)	
8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer "Yes" if: a) any applicant named in part 3 is not an inventor, or b) there is an inventor who is not named as an applicant, or c) any named applicant is a corporate body: See note (d))	Yes		

Patents Form 1/77

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Continuation sheets of this form

Description	11	—
Claim(s)	3	— 24
Abstract	1	—
Drawing(s)	3	+ 3

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Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77) 1 /

Request for preliminary examination and search (Patents Form 9/77) 1 /

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application

Signature

Date 3 August 1999

J A KEMP & CO.

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DATA BROADCAST METHOD

The present invention relates to a data broadcast system and method and, more particularly, to a method of broadcasting data services
5 with broadcast signals and a system for selectively providing portions of the broadcast data service to the user.

Digital television systems have become widely used for broadcast systems. The digital television systems provide digitisation and compression of the image to be broadcast with technologies such as
10 MPEG-2 compression. The broadcast pictures are hence encoded and conveyed to the digital television receivers in the home as a digital data sequence. Digital television has a number of advantages over conventional analogue television, such as increased capacity and increased robustness to noise and interference.

15 Digital television systems also allow many kinds of data to be carried seamlessly within broadcasts carrying audio and visual data. Hence, many new services can be provided through the digital TV receiver to the viewer.

A popular analogue service that uses additional data carried within
20 the broadcast transmission is the teletext service. The teletext service is carried as digital data within certain transmission lines of the vertical blanking interval (VBI) of the TV signal. The VBI is the time allowed for the raster scan to return to the top of the screen and hence this time is not used to carry any useful picture information. Some lines are set aside
25 for teletext data and the digital data is modulated onto the broadcast TV signal.

Teletext systems broadcast a number of "pages" of data in cycles

with a page being typically updated every 2 to 3 minutes. The update cycle time depends on how many pages are broadcast in the cycle, there being only a small bandwidth available for the teletext data. Upon selecting a page, the viewer has to then wait for the page to be delivered
5 as part of the cycle - this time will be on average half the total cycle time for all the pages.

Typical teletext systems provide the latest news, sport and TV guide information and also reference information and advertising. Teletext systems are very useful for providing "headline" information
10 such as sports results when there is no other means of obtaining the information.

A very popular use for the teletext systems is to find out the latest information for some rapidly changing event such as a sports event. Often this can be the only way the viewer can obtain this information,
15 because sports events are often not screened live, are carried as part of a pay-per-view service or have finished such that the programmes are now carrying other content. Hence, this allows the viewer to catch up with "missed" content such as sports events or news broadcasts by other means using the data services.

20 A problem with previous broadcast data services is that they communicate very little information - perhaps just the score of a football match for instance. The user, although not wanting to see the whole sports event, would like a little more information than just the score - maybe to see video of the goals or near misses in the example of a
25 football match.

However, to provide a service like this there are further problems. Simple data services such as teletext can be provided easily with a low

bandwidth. Providing an enhanced data service with audio and visual data would require more bandwidth or take a lot longer to update and cycle the information.

Viewers have different interests and priorities, so what is
5 important to one viewer is of little interest to another. Screening news "highlights" in a sequence that repeats and updates every 15 minutes is not appealing to a viewer if they have one item they would like to see and have to wait an average of 7.5 minutes to see this item.

Digital broadcast systems can provide more bandwidth for
10 program content. However, this bandwidth is still at a premium. Using some of the bandwidth to provide broadcast data services can be considered wasteful, particularly if there is other content that could be screened at the same time to a reasonable audience. Indeed, screening live video and audio as a broadcast data service will still take up
15 approximately 2Mbit/s of bandwidth using MPEG-2 compression.

According to the present invention, there is provided a method of broadcasting a broadcast data service together with broadcast digital television data as part of a broadcast signal, the broadcast data service comprising a plurality of data portions the method comprising, during
20 normal broadcasting, only broadcasting portions of the broadcast data service required to replace previous respective portions which have been changed such that receivers of the broadcast signal may store all of the current portions of the broadcast data service and update the stored portions according to replacement portions received with the broadcast
25 signal.

In this way, the bandwidth required for maintaining an enhanced broadcast data service may be reduced, such that the cycle time may also be kept to a minimum. Furthermore, since receivers may use a memory to store the entire broadcast data service, near instantaneous access is
5 possible for the users.

According to the present invention, there is also provided a system for selectively providing portions of a broadcast data service transmitted together with broadcast digital television data as part of a broadcast signal, the system comprising:

10 a processor for extracting portions of the broadcast data service available from the broadcast signal;

a memory for storing all of the current portions of the broadcast data service; and

a controller for identifying corresponding extracted and stored
15 portions and for replacing data portions stored in the memory with respective portions extracted from the broadcast signal, the controller further being responsive to a selection signal to cause the memory to output selected portions of the broadcast data service.

Thus, at the receiving end, a user's device continually updates the
20 stored complete broadcast data service and is able to retrieve any desired selected portions of the broadcast data service in a near instantaneous manner.

Preferably, the method of broadcasting includes additionally
broadcasting all of the current portions of the broadcast data service to
25 enable a user to obtain all portions of the broadcast data service soon after initial connection. This may be achieved by using a separate dedicated channel or by periodically using an expanded bandwidth at a

time of low demand for the broadcast digital television data.

The system may be provided with additional means for accessing the complete broadcast data service from a different channel.

In this way, after a receiving system has been disabled for some
5 time or has first been connected, the memory can be filled with the current version of the broadcast data service for future update.

The receiving system may be constructed as a single integral unit comprising a digital television receiver. Alternatively, various components of the system may be constructed separately and linked by
10 means of a network, such as using an IEEE 1394 interface.

In this way, a single television receiver/display could provide all of the functions of the present invention. Alternatively, a television/display could be connected by means of an IEEE 1394 interface with a broadcast data service unit which either has its own
15 receiver or makes use of the receiver of the television display to obtain the broadcast data service portions. Similarly, the memory could be provided in the broadcast data service unit or separately, for instance again connected with an IEEE 1394 interface.

The invention will be more clearly understood from the following
20 description, given by way of example, with reference to the accompanying drawings, in which:-

Figure 1 illustrates a system for receiving broadcast data services according to the present invention;

Figure 2 illustrates a system for receiving broadcast data services
25 according to the present invention; and

Figure 3 illustrates the periodic transmission of a complete broadcast service.

For the broadcast of broadcast data services, such as teletext, data is cyclically processed and provided to the user. It is now proposed to provide enhanced broadcast data services which will include more data. Unless substantial bandwidth is used, this will result in extended cycle
5 times. In particular, if an enhanced service showing audio/video clips and data has a very long cycle time, then the service will be undesirable for the intended application of a quick newsflash style update on the days news or sports events.

To overcome this problem, it is proposed to store an entire cycle of
10 a broadcast data service such that the user can display any portion of the service instantaneously at any time. All portions of the broadcast data service of the cycle are stored in a memory. Indeed, the data portions may be obtained when a user is not viewing the broadcast data service or has the receiver on standby.

15 Figure 1 illustrates schematically various components of a system for receiving a broadcast data service.

A receiver 2 is provided for obtaining and demodulating transmitted data from an aerial, cable, satellite or the like. The demodulated data includes digital television data, together with
20 associated broadcast service data.

Under the control of a control panel 4 or remote control, a video processor 6 extracts data from a received signal for a selected video channel and displays that video channel on the display 8.

A processor 10 is also provided for extracting any broadcast
25 service data from the received signal. This data is stored in a memory 12 under the control of a controller 14. A user may then select (possibly

using the control panel 4) desired portions of the data broadcast service. Under the control of the controller 14, the memory 12 then outputs appropriate data for display on the display 8.

The memory 12 can be provided as a magnetic disc, for instance as is commonly known as a hard disc drive, a semiconductor memory or other means.

The system of Figure 1 can be provided integrally within a television unit. However, it is also possible for various components of the system to be distributed around a network, for instance using the IEEE 1394 interface. This is illustrated in Figure 2.

The system may be provided merely with an external storage device. Similarly, the system may be provided as a broadcast service unit for connection to a television display and the broadcast service unit may itself have an internal memory or use an external memory. Just as with an integral design, the broadcast service unit can obtain received digital data from the receiver, process portions of the data appropriately and provide selected portions to the television display upon demand.

With regard to transmission bandwidth of a broadcast service, an audio/visual stream can typically consume 2 Mbit/s using current MPEG-2 compression technologies. This could be construed as wasteful.

By making use of the memory of the system, it is possible to broadcast the audio and visual data at a rate slower than real time. The audio and visual data is extracted from the broadcast data service and stored in the memory 12 of the system. When the audio/visual data is required for playback, the system can then retrieve the data at the

required data rate allowing replay in real-time. In this way, by halving the broadcast rate of the audio/visual data, the bandwidth consumption of that portion of the service would also be halved. Although the cycle time would therefore also be doubled, by means of the memory of the system, access would be immediate unless a user happened to request a portion while it was being broadcast.

It could also be construed as wasteful using bandwidth to cycle the same content only with slight updates each time rather than for "real" live content such as films, news and sports broadcasts.

In a service where portions of the broadcast data service are cycled, there is a trade off between the bandwidth consumed by the service and the cycle rate. The service can offer a rapid update rate if it consumes a large amount of bandwidth. That bandwidth can be reduced, but will result in cycle time being increased.

For the user of the service, the most visible parameter is the cycle rate. The viewer will want to have up-to-date information as soon as possible and will not want to have to wait. Hence, this is one of the key requirements for the service. On the other hand, for the service provider, the bandwidth consumed is probably the most important parameter. The bandwidth consumed by, in particular, data broadcast service affects the bandwidth available for other broadcast data services and television data itself. A reduction in the bandwidth available for other services is hence likely to affect the revenue available to the service provider.

For many broadcast data services, large numbers of the portions of a broadcast data service remain the same for each cycle. For instance, for traditional style pages as used with teletext, most pages might remain the same from one cycle to the next. Similarly, when transmitting

audio/visual news or sports clips with a broadcast data service, it is likely that the same clips will be provided for an extended period of time during the day.

In order to take advantage of this fact, it is proposed to transmit
5 only portions of the data broadcast service which have changed from one cycle to the next. In this way, there may be provided a relatively fast update rate for information on the service with an efficient use of bandwidth for the service provider.

A broadcast data service may take many different forms. It may
10 be transmitted cyclically as a carousel of main information topics. It is also possible that, within each topic, further data portions are transmitted cyclically as a sub-carousel. Each data portion may consist of a traditional style page of data or may consist of other data such as image data or audio/visual data. An entire page or audio/visual data sequence
15 can be considered as a portion or a page or audio/visual sequence can be made up of a number of portions. Irrespective, the system should provide the data in portions which can be replaced individually in such a way as to update the overall broadcast service. Hence, individual bytes of data or groups of bytes could be considered as "portions" provided
20 that the system allows individual replacement of such portions.

However, for very small portions, such as individual bytes, the protocol overhead for embodying the system is likely to be undesirably high.

For a receiver that has no previously stored content, the
"differential" content will not be useful, as it will not comprise the full
25 service. This situation will arise for instance when the memory of the broadcast service unit is first connected to the system.

It is possible to configure the system such that over time, by

storing all of the updated portions, the complete broadcast data service will be established. Alternatively, however, the full service could be broadcast either on a different dedicated channel (possibly by means of a non-broadcast download service) or at times when the demand for other
5 conventional broadcast is lower. Referring to Figure 3, it will be seen that, at these times, the bandwidth allocated for those conventional services can be reduced. As a result, the bandwidth available for the broadcast data services can be increased. This allows a receiver to quickly update its stored broadcast service information with the full
10 information service. Subsequently, in the normal way, the system can keep up to date with the service using the differential update stream.

The service provided using this system could not only carry MPEG-2 encoded audio and video data, but could also carry information which has been compressed and encoded using other more suitable or
15 efficient protocols. For instance, a football match could take advantage of the fact that most of the content features a lot of green with only a few small moving areas.

In this situation, an algorithm for decompressing and decoding could be delivered to the receiver and then executed by the receiver
20 under a pre-defined protocol.

Since received broadcast service data is being stored off line and the decoding operation does not need to be executed in real time, the processing requirements for the decompression and decoding are not so great. Hence, the receiver processor can decode the content as a
25 background task for display later.

It should be appreciated that the data content of the broadcast data

service need not be limited to audio/visual data or traditional data pages. The content can be suitable for use by an interactive engine in the receiver/broadcast service data unit. In this way, a mixed service could be provided featuring text, graphics and audio/visual clips.

- 5 Data portions may also comprise data requiring off-line decoding. The data need not necessarily be a program, but could be any sort of data.

 MPEG compression and decompression systems are designed to be used in a broadcast system with limited decompression memory in the
10 receiver, a small delay (of the order of a second) in decode delay and a limited "pick-up" delay (where "pick-up" delay is the delay when a receiver is turned on and has to wait a few frames for a full "I-frame" when it can pick-up the transmission and start decoding).

- By virtue of the present invention, it is possible to use
15 compression/decompression programs which rely on having the whole data file present to be able to execute. In particular, by storing the data off-line, such compression/decompression becomes possible and it is possible to comprise MPEG transport streams off-line to give a much smaller file.

CLAIMS

1. A system for selectively providing portions of a broadcast data service transmitted together with broadcast digital television data as
5 part of a broadcast signal, the system comprising:

a processor for extracting portions of the broadcast data service available from the broadcast signal;

a memory for storing all of the current portions of the broadcast data service; and

10 a controller for identifying corresponding extracted and stored portions and for replacing data portions stored in the memory with respective portions extracted from the broadcast signal, the controller further being responsive to a selection signal to cause the memory to output selected portions of the broadcast data service.

15 2. A system according to claim 1 wherein the memory is a magnetic hard disk drive or a semiconductor memory.

3. A system according to claim 1 or 2 further comprising a digital television receiver for providing the broadcast signal to the processor.

20 4. A system according to claim 3 wherein the system is constructed as a single integral unit.

5. A system according to claim 3 wherein at least the memory is constructed in a unit separate from the digital television receiver and linked by means of a network connection such as an IEEE 1394
25 interface.

6. A system according to claim 3, 4 or 5 wherein the digital television receiver selectively provides digital television data for display

and wherein the processor extracts the portions of the broadcast data service irrespective of that display.

7. A system according to any one of claims 3 to 6 wherein, if periodically the broadcast signal includes all of the portions of the
5 broadcast data service, the controller can store all of the received portions in the memory.

8. A system according to any preceding claim wherein the controller can also access an additional data channel so as to obtain and store in the memory all of the portions of the broadcast data service.

10 9. A method of broadcasting a broadcast data service together with broadcast digital television data as part of a broadcast signal, the broadcast data service comprising a plurality of data portions, the method comprising, during normal broadcasting, only broadcasting portions of the broadcast data service required to replace previous respective
15 portions which have been changed such that receivers of the broadcast signal may store all of the current portions of the broadcast data service and update the stored portions according to replacement portions received with the broadcast signal.

10. A method according to claim 9 further comprising
20 additionally broadcasting all of the current portions of the broadcast data service to enable a user to obtain all portions of the broadcast data service soon after initial connection.

11. A method according to claim 10 wherein all of the current portions of the broadcast data service are broadcast using a separate
25 dedicated channel.

12. A method according to claim 10 or 11 wherein all of the current portions of the broadcast data service are broadcast periodically

using an expanded bandwidth at a time of low demand for the broadcast digital television data.

13. A system according to any one of claims 1 to 8 or a method according to any one of claims 9 to 12 wherein at least one of the
5 portions comprise audio/video data and is transmitted in a non-real time format.

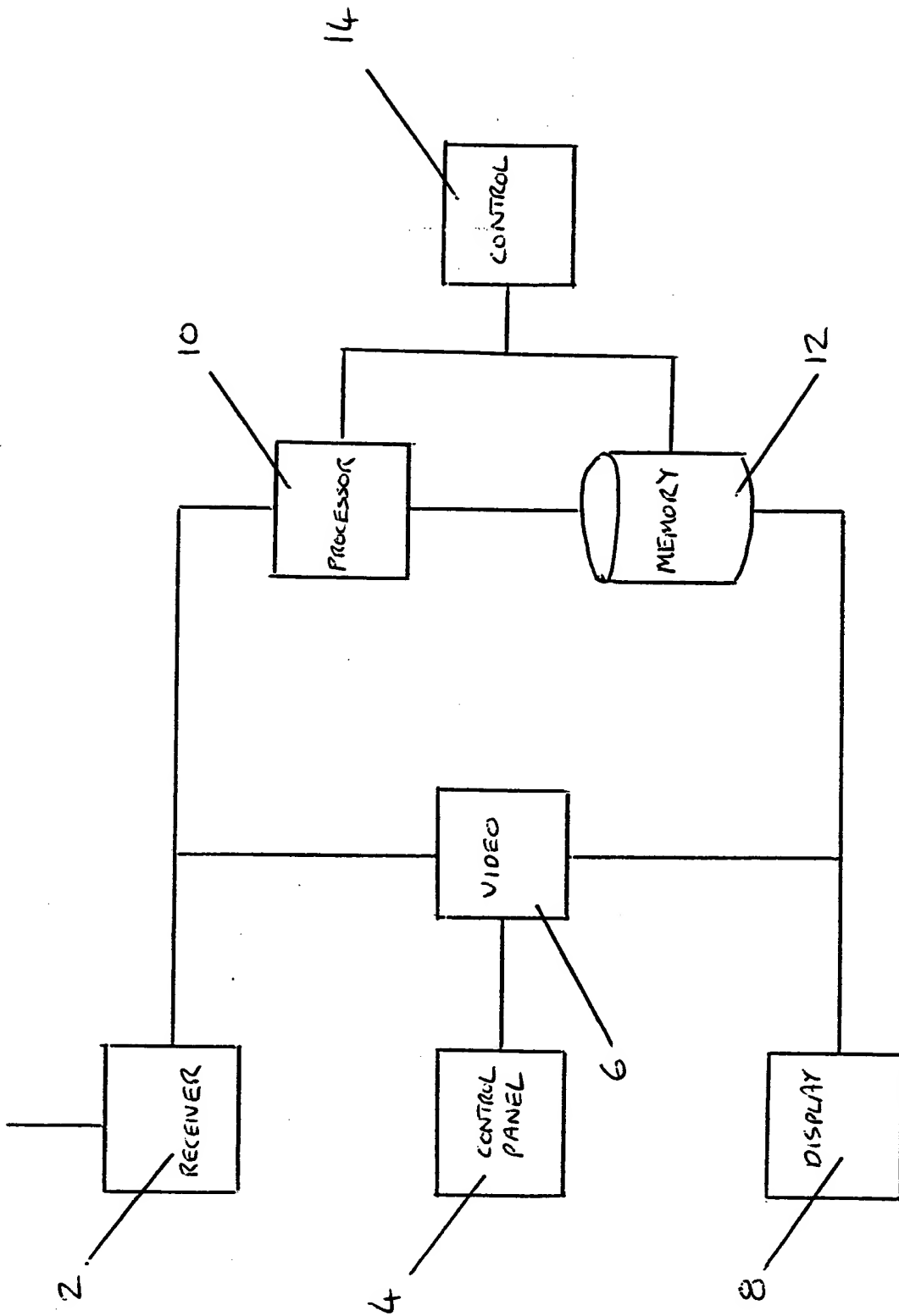
14. A system or method according to any preceding claim wherein at least one of the portions comprises data-requiring off-line decoding.

10 15. A system for selectively providing portions of a broadcast data service constructed and arranged substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings.

15 16. A method of broadcasting data services substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings.

ABSTRACT
DATA BROADCAST METHOD

A method of broadcasting a broadcast data service together with broadcast digital television data as part of a broadcast signal, the broadcast data service comprising a plurality of data portions, the method comprising, during normal broadcasting, only broadcasting portions of the broadcast data service required to replace previous respective portions which have been changed, a receiving system having a processor for extracting portions of the broadcast data service available from the broadcast signal, a memory for storing all of the current portions of the broadcast data service and a controller for identifying corresponding extracted and stored portions and for replacing data portions stored in the memory with respective portions extracted from the broadcast signal, the controller further being responsive to a selection signal to cause the memory to output selected portions of the broadcast data service.

Fig 1

213.

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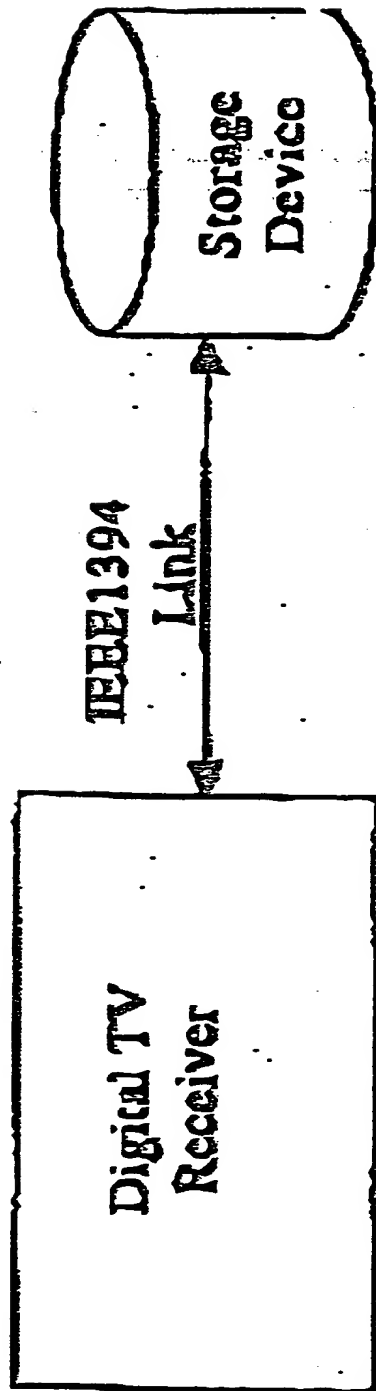
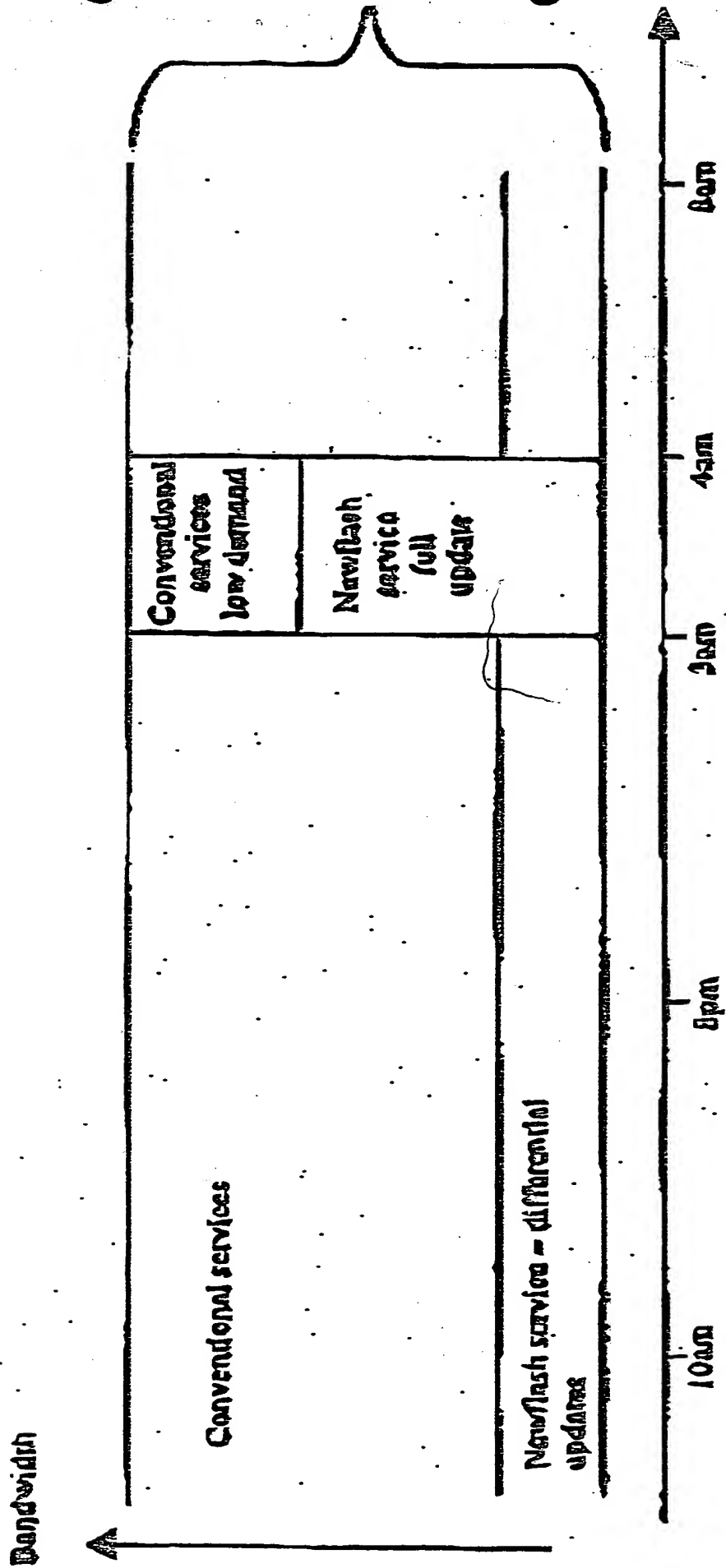


Fig 2

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